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Enhancement of Low Quality Degraded Video Using Haar Wavelet Decomposition Technique

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Abstract: The point recommends the general system for video improvement, object location and following continue at the same time in an aggressive and helpful way .Video is a gathering of successive pictures with a consistent time interim. So video can give more data about the article when situations are changing regarding time. Thusly, physically taking care of recordings are entirely unimaginable. So there is need of a computerized gadget to handle these recordings. Numerous calculations and innovation have been created to robotize video improvement and checking the article in a video document. Video improvement with item identification and following is a one of the testing errand in PC vision. Additionally, following of an article essentially includes two going before steps object identification and item representation. Object discovery is performed to check presence of items in video and to correctly find that article .Object following is a procedure of dividing a district of enthusiasm from a video scene and monitoring its movement, position and impediment. The following is performed by observing articles' spatial and transient changes amid a video grouping, including its nearness, position, size, shape, and so forth. Video improvement with article following is utilized as a part of a few applications, for example, video reconnaissance, robot vision, movement observing.

Keywords: *Haar Wavelet, Video Enhancemnet, Frame Rate, Mean Intensity.*

1. INTRODUCTION:

Video surveillance is an active research topic in computer vision that tries to detect, recognize and track objects over a sequence of images and it also makes an attempt to understand and describe object behavior by replacing the aging old traditional method of monitoring cameras by human operators. Object detection and tracking are important and challenging tasks in many computer vision applications such as surveillance, vehicle navigation and autonomous robot navigation. Object detection involves locating objects in the frame of a video sequence. Every tracking method requires an object detection mechanism either in every frame or when the object first appears in the video. Object tracking is the process of locating an object or multiple objects over time using a camera. The high powered computers, the availability of high quality and inexpensive video cameras and the increasing need for automated video analysis has generated a great deal of interest in object tracking algorithms. There are three key steps in video analysis,

- detection interesting moving objects
- tracking of such objects from each and every frame to frame analysis of object tracks to recognize.

1.1. Objectives

- Enhancement of low degraded video to realize the great quality video and higher frame quality.
- The separation of Associate in Nursing audio and frames in uncompressed low vision video to reinforce inferiority video and perform object detection.
- To Improve the speed and accuracy of technique used for police work target image at intervals less time.
- To increased frames of pictures that works well below image blur, camera motion, modification of cause, illumination, and scale conditions
- To propose increased object following techniques supported following rule used template matching methodology.
- To find target object and match each frames in video
- To bring home the bacon Noise Free Video.

1.2 Scope

Many algorithms and technology have been developed to automate monitoring the object in a video file. Object detection and tracking is a one of the challenging task in computer vision. Also, tracking of an object mainly involves two preceding steps object detection and object representation. Object detection is performed to check existence of objects in video and to precisely locate that object .Object tracking is a process of segmenting a region of interest from a video scene and keeping track of its motion, position and occlusion. The tracking is performed by monitoring objects' spatial and temporal changes during a video sequence, including its presence, position, size, shape, etc. Object tracking is used in several applications such as video surveillance, robot vision, traffic monitoring.

2. LITERATURE SURVEY

The research conducted so far for object detection and tracking objects in video surveillance system are discussed in this chapter. The set of challenges outlined above span several domains of research and the majority of relevant work will be reviewed in the upcoming chapters. In this section, only the representative video surveillance systems are discussed for better understanding of the fundamental concept. Tracking is the process of object of interest within a sequence of frames, from its first appearance to its last. The type of object and its description within the system depends on the application. During the time that it is present in the scene it may be occluded by other objects of interest or fixed obstacles within the scene. A tracking system should be able to predict the position of any occluded objects. Object tracking systems are typically geared towards surveillance application where it is desired to monitor people or vehicles moving about an area.

[M. kim, 2014] propose a novel framework for enhancement of very low-light video. For noise reduction, motion adaptive temporal filtering based on the Kalman structured updating is presented. Dynamic range of denoised video is increased by adaptive adjustment of RGB histograms. The proposed method exploits color filter array (CFA) raw data for achieving low memory consumption. The adaptive temporal filter based on the Kalman filter and adopted the NLM denoising for further smoothing. Histogram adjustment using the gamma transform and the adaptive clipping threshold is also presented to increase the dynamic range of the low-light vid234eo.

[W. Zhong, 2014] proposed method based on a sparse collaborative model that exploits both holistic templates and local representations to account for drastic appearance changes. Develop a sparse discriminative classifier (SDC) and sparse generative model (SGM) for object tracking. In the SDC module, we present a classifier that separates the foreground object from the background based on holistic templates. It plays a critical role in numerous vision applications such as motion analysis, activity recognition, visual surveillance and intelligent user interfaces. Local representations are adopted to form a robust histogram that considers the spatial information among local patches with an occlusion handling module, which enables our tracker to better handle heavy occlusions.

[N. Kumar, 2015] proposed Mean and Median image filtering algorithms are compared based on their ability to reconstruct noise affected images. The purpose of these algorithms is to remove noise from a signal that might occur through the transmission of an image. These algorithms can be applied to one-dimensional as well as two-dimensional signals. A new framework for removing impulse noise from images is presented in which the nature of the filtering operation is conditioned on a state variable defined as the output of a classifier that operates on the differences between the input pixel and the remaining rank-ordered pixels in a sliding window. In this comparison of noise removal filters, the experiment has been conducted for different images and at various noise levels, and is seen that Median filters performed the best overall noise compositions tested by providing minimum MSE.

2.1 Problem formulation

In this thesis our aim is to improve the performance of object detection and object tracking for low vision video. The detection and recognition of objects proceed simultaneously with image segmentation in a competitive and cooperative manner. Problem occurred in variety of dynamic environments, it has a strong adaptability, but it is generally difficult to obtain complete outline of moving object, responsible to appear the empty phenomenon, as a result the detection of moving object is not accurate. So need to improve the technique.

To achieve this, the following specific objectives

- To propose object detection techniques that to effectively identify objects of interest area in video sequence.
- To propose frames enhancement techniques that improve the quality of degraded frames by using enhance frame, filter object and spatial noise reduction algorithms.

To propose enhanced object tracking techniques based on tracking algorithm used template matching method.

2.2 Proposed System

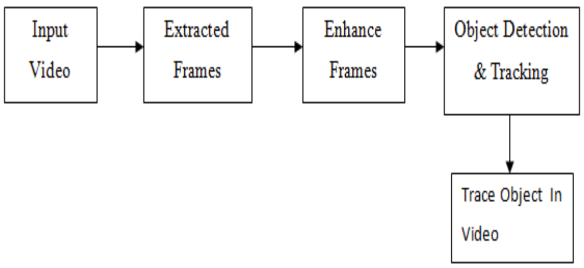
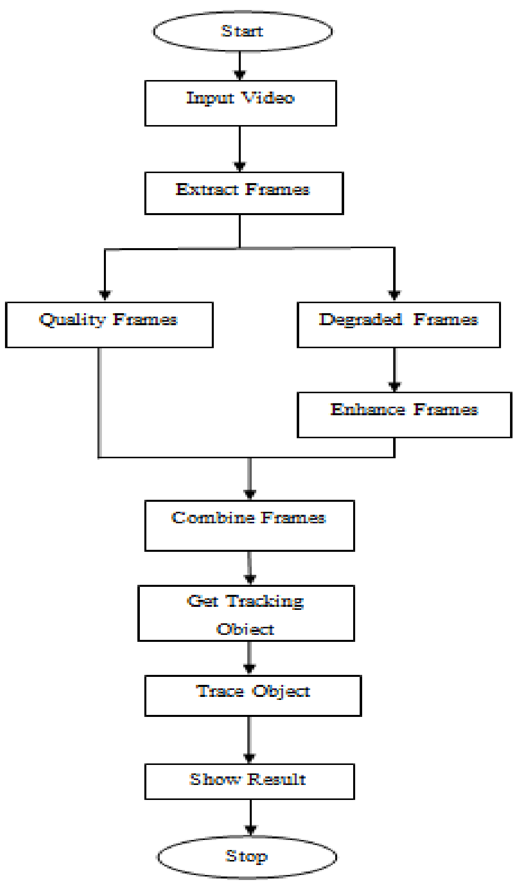


Fig 3.1: Architecture of Proposed Method

2.3 Data flow diagram



Algorithm 3.1.2

Input : - Video

Output: - 1. Show trace object into frames
2. Show trace object into video
3.Show the difference between original frame and enhance frame (Result analysis).

Step 1: Take sample video as input -Read the sample video file.

Step 2: Extract frames and sound separately in video file.

Step 3: Decomposed Frames into Haar Wavelet Transform.

Step 4: Check the video quality
If (Low video quality: need to enhance)
Else (no need to enhance)

Step 5: Enhance frame (enhance the quality of frame used filter object And spatial noise reduction method)

Step 6: Load enhance frame

Step 7: Get track object into enhance frame

Step 8: Check tracking object into all enhance frame (with strong feature)

Step 9: Store and display the trace object with square box into video.

Step 10: Show the difference between the original frame and enhance frame.

Algorithm 3.1..3: Quality Decision
Step 1: Start
Step 2: Read Extract frames.
Step 3: Check the video quality
For i=1: length(Efi)
Read EFi
If M.I.(Efi) > threshold
Add to Quality frame EFi
Else
Add EFi to Degraded frame
End
End
Step 4: Stop
In above algorithm: M.I- Mean Intensity
EFi- Extract frame for 1 to length. Here threshold if fixed.

Algorithm 3.1..4: Enhance frames
Step 1: Start
Step 2: Read Degraded frames
Step 3: For i=1: length(Dfi)
Read DFi
If((MI<=0.1)&&(MI>0.0))
Width=0.7;
End
If((MI>0.1)&&(MI<=0.2))
Width=0.75;
End

```
        If((MI>0.2)&&(MI<=0.3))
        Width=0.8;
        End
        If((MI>0.3)&&(MI<=0.4))
        Width=0.85;
        End
        If((MI>0.4)&&(MI<=0.5))
        Width=0.9;
        End
Step 4:  Save DFi
        End
Step 5:  Stop
```

In that compare mean intensity of degraded frame and set new enhance factor of degraded frame. Improve the quality of degraded frames.

Algorithm 3: Filter object algorithm

```
Step 1:Start
Step 2:Read all enhance frame from enhance algorithm
Step 3:  For i=1: length(Efi)
            Read EFi
            EFi = Histogram Equalize (EFi)
            Save EFi
            End
Step 4:  Stop
```

1. **Result Analysis**

Sr No	Methods	Total Frames	Enhance Frames	Quality
1	Proposed	50	48	96
2	Histogram Equalization	50	35	70
3	Weber's Law	50	32	64
4	Spatial Noise	50	43	86
5	Constrast Enhancement	50	23	46
6	Invert Method	50	28	56

Table 4.2 Result Analysis

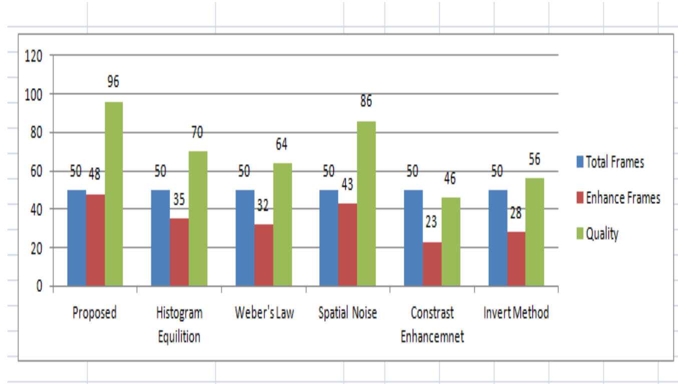


Figure 4.1 Graph Analysis for table 4.2

Sr.No	Object Present	Object detected	True Detection Rate(%)	False Detection Rate	Error Rate
1	10	8	80	3	20
2	15	14	93.33	5	6.67
3	20	18	90	2	10
4	25	22	88	2	12
5	30	27	90	1	10

Table 4.3 Object Detection Analysis

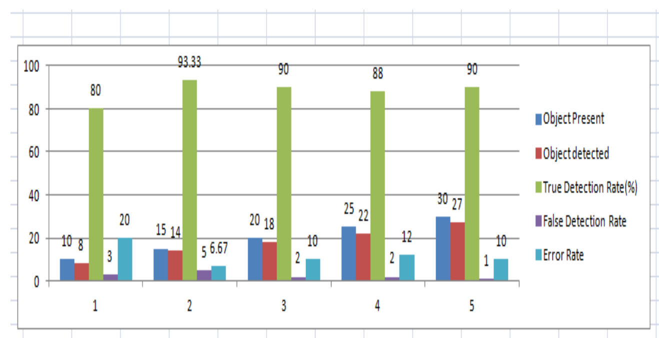


Fig 4.2 Graph Analysis for table 4.3

3. CONCLUSION

From above analysis, it is observed that, proposed methodology gives better result even for low light video too. That helps in intruder detection, security application

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